

What is claimed is

1. A drive control apparatus for a hybrid vehicle,
comprising:

5 a first motor coupled to a rotational shaft of an
engine;

a first drive wheel for receiving drive power from said
rotational shaft through first clutches;

a second motor;

10 a second drive wheel for receiving drive power from
said second motor;

a first battery for supplying electric power to said
first motor and said second motor; and

15 a controller for controlling said first motor, said
second motor, said first clutches, and said engine;

wherein said controller controls an electric vehicle
mode in which said first clutches are disengaged, the supply
of fuel to said engine is stopped, and said second motor
drives said second drive wheel to propel the hybrid vehicle,
20 and said electric vehicle mode is at least divided into a
first propulsion mode and a second propulsion mode;

said first propulsion mode is a mode in which said
first motor is de-energized; and

25 said second propulsion mode is a mode in which a load
imposed on said second motor is greater than in said first
propulsion mode, and said first motor is supplied with
electric power to rotate said rotational shaft at a

predetermined speed.

2. A drive control apparatus according to claim 1,
wherein said controller switches between said first
5 propulsion mode and said second propulsion mode based on
drive power required to propel the hybrid vehicle, a vehicle
speed, and a rotational speed and/or a torque of said second
motor.

10 3. A drive control apparatus according to claim 1,
wherein said controller switches between said first
propulsion mode and said second propulsion mode based on a
state of charge of said first battery.

15 4. A drive control apparatus according to claim 1,
wherein said controller switches between said first
propulsion mode and said second propulsion mode when said
hybrid vehicle is cruising.

20 5. A drive control apparatus according to claim 1,
wherein said controller switches between said first
propulsion mode and said second propulsion mode based on
vehicle speeds which allow said hybrid vehicle to achieve a
predetermined acceleration with the output of said second
25 motor.

6. A drive control apparatus according to claim 1,

wherein said controller switches between said first
propulsion mode and said second propulsion mode based on a
rotational speed of said second motor which allows said
hybrid vehicle to achieve a predetermined acceleration with
5 the output of said second motor.

7. A drive control apparatus according to claim 1,
further comprising:

10 a second clutch disposed between said second motor and
said second drive wheel, for being controlled by said
controller;

15 wherein said controller switches to an engine
propulsion mode in which said first clutches are engaged to
transmit drive power of at least one of said engine and said
first motor to said first drive wheel, said second clutch
being disengaged and said second motor is de-energized in
said engine propulsion mode.

20 8. A drive control apparatus according to claim 7,
wherein when said engine propulsion mode changes to said
electric vehicle mode,

25 said controller equalizes the sum of the drive power
transmitted to said first drive wheel and the drive power
transmitted to said second drive wheel to drive power
required to propel the hybrid vehicle, and gradually changes
each of the drive power transmitted to said first drive
wheel and the drive power transmitted to said second drive

wheel.

9. A drive control apparatus according to claim 7,
further comprising:

5 a battery usage decision unit for determining whether
said first battery is not usable;

wherein said controller performs said engine propulsion
mode if it is judged by said battery usage decision unit
that said first battery is not usable.

10 10. A drive control apparatus according to claim 1,
wherein when said electric vehicle mode changes to said
engine propulsion mode,

15 said controller equalizes the sum of the drive power
transmitted to said first drive wheel and the drive power
transmitted to said second drive wheel to drive power
required to propel the hybrid vehicle, gradually changes
each of the drive power transmitted to said first drive
wheel and the drive power transmitted to said second drive
20 wheel, and engages said first clutches when the output of
said engine reaches a predetermined threshold after the
engine has started.

25 11. A drive control apparatus according to claim 1,
wherein said controller is supplied with electric power from
a second battery whose voltage is lower than said first
battery.

12. A drive control apparatus according to claim 1,
wherein at least one cylinder of said engine is disabled in
said second propulsion mode.

5

13. A drive control apparatus according to claim 1,
wherein rotation of said second motor is reduced in speed by
a gear mechanism and transmitted to said second drive wheel.